SEQUENCE LISTING

<110> Levy , Ilan
Shoseyov, Oded
Nussinovitch, Amos

<120> MODIFICATION OF POLYSACCHARIDE CONTAINING MATERIALS

<130> 00/20910

<140> 60/166,389 and 60/164,140

<141> 1999-11-18 and 1999-11-08

<160> 13

<170> PatentIn version 3.0

<210> 1

<211> 507

<212> DNA

<213> Clostridium cellulovorans

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atgacgtaaa agttagatat tattacacaa gtgatggtac acaaggacaa actttctggt 180

gtgaccatgc tggtgcatta ttaggaaata gctatgttga taacactagc aaagtgacag 240

caaacttcgt taaagaaaca gcaagcccaa catcaaccta tgatacatat gttgaatttg 300

gatttgcaag cggacgagct actcttaaaa aaggacaatt tataactatt caaggaagaa 360

taacaaaatc agactggtca aactacactc aaacaaatga ctattcattt gatgcaagta 420

gttcaacacc agttgtaaat ccaaaagtta caggatatat aggtggagct aaagtacttg 480

gtacagcacc ataggatcca gatgtac 507

<210> 2

<211> 163

<212> PRT

<213> Clostridium cellulovorans

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20 25 30

Ser Asp Ser Asp Leu Asn Leu Asn Asp Val Lys Val Arg Tyr Tyr Tyr
35 40 45

Thr Ser Asp Gly Thr Gln Gly Gln Thr Phe Trp Cys Asp His Ala Gly
50 55 60

Ala Leu Leu Gly Asn Ser Tyr Val Asp Asn Thr Ser Lys Val Thr Ala
65 70 75 80
Asn Phe Val Lys Glu Thr Ala Ser Pro Thr Ser Thr Tyr Asp Thr Tyr
85 90 95
Val Glu Phe Gly Phe Ala Ser Gly Arg Ala Thr Leu Lys Lys Gly Gln
100 105 110
Phe Ile Thr Ile Gln Gly Arg Ile Thr Lys Ser Asp Trp Ser Asn Tyr
115 120 125
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Val Asn Pro Lys Val Thr Gly Tyr Ile Gly Gly Ala Lys Val Leu Gly
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Thr Ala Pro

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attattacac aagtgatggt acacaaggac aaactttctg gtgtgaccat gctggtgcat 180
tattaggaaa tagctatgtt gataacacta gcaaagtgac agcaaacttc gttaaagaaa 240
cagcaagccc aacatcaacc tatgatacat atgttgaatt tggatttgca agcggacgag 300
ctactcttaa aaaaggacaa tttataacta ttcaaggaag aataacaaaa tcagactggt 360
caaactacac tcaaacaaat gactattcat ttgatgcaag tagttcaaca ccagttgtaa 420
atccaaaagt tacaggatat ataggtggag ctaaagtact tggtacagca ccaggtccag 480
atgtaccatc ttcaataatt aatcctactt ctgcaacatt tgatcccggt accatggcta 540
gcatgactgg tggacagcaa atgggtcgga tcc 573

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<213> Clostridium cellulovorans
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1 5 10 15

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Leu Asn Asp Val Lys Val Arg Tyr Tyr Tyr Thr Ser Asp Gly Thr Gln
        35                  40                  45
Gly Gln Thr Phe Trp Cys Asp His Ala Gly Ala Leu Leu Gly Asn Ser
    50                  55                  60
Tyr Val Asp Asn Thr Ser Lys Val Thr Ala Asn Phe Val Lys Glu Thr
65                  70                  75                  80
Ala Ser Pro Thr Ser Thr Tyr Asp Thr Tyr Val Glu Phe Gly Phe Ala
                85                  90                  95
Ser Gly Arg Ala Thr Leu Lys Lys Gly Gln Phe Ile Thr Ile Gln Gly
            100                 105                 110
Arg Ile Thr Lys Ser Asp Trp Ser Asn Tyr Thr Gln Thr Asn Asp Tyr
        115                 120                 125
Ser Phe Asp Ala Ser Ser Ser Thr Pro Val Val Asn Pro Lys Val Thr
    130                 135                 140
Gly Tyr Ile Gly Gly Ala Lys Val Leu Gly Thr Ala Pro Gly Pro Asp
145                 150                 155                 160
Val Pro Ser Ser Ile Ile Asn Pro Thr Ser Ala Thr Phe Asp Pro Gly
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Thr Met Ala Ser Met Thr Gly Gly Gln Gln Met Gly Arg Ile
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<213> Clostridium cellulovorans

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attattacac aagtgatggt acacaaggac aaactttctg gtgtgaccat gctggtgcat     180
tattaggaaa tagctatgtt gataacacta gcaaagtgac agcaaacttc gttaaagaaa     240
cagcaagccc aacatcaacc tatgatacat atgttgaatt tggatttgca agcggacgag     300
ctactcttaa aaaaggacaa tttataacta ttcaaggaag aataacaaaa tcagactggt     360
caaactacac tcaaacaaat gactattcat ttgatgcaag tagttcaaca ccagttgtaa     420
atccaaaagt tacaggatat ataggtggag ctaaagtact tggtacagca ccaggtccag     480
atgtaccatc ttcaataatt aatcctactt ctgcaacatt tgatcccggt accatggcag     540
cgacatcatc aatgtcagtt gaattttaca actctaacaa atcagcacaa acaaactcaa     600
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ttacaccaat aatcaaaatt actaacacat ctgacagtga tttaaattta aatgacgtaa 660

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ctggtgcatt attaggaaat agctatgttg ataacactag caaagtgaca gcaaacttcg 780

ttaaagaaac agcaagccca acatcaacct atgatacata tgttgaattt ggatttgcaa 840

gcggacgagc tactcttaaa aaaggacaat ttataactat tcaaggaaga ataacaaaat 900

cagactggtc aaactacact caaacaaatg actattcatt tgatgcaagt agttcaacac 960

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cataggatcc 1030

<210> 6

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<212> PRT

<213> Clostridium cellulovorans

<400> 6

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20 25 30

Leu Asn Asp Val Lys Val Arg Tyr Tyr Tyr Thr Ser Asp Gly Thr Gln
35 40 45

Gly Gln Thr Phe Trp Cys Asp His Ala Gly Ala Leu Leu Gly Asn Ser
50 55 60

Tyr Val Asp Asn Thr Ser Lys Val Thr Ala Asn Phe Val Lys Glu Thr
65 70 75 80

Ala Ser Pro Thr Ser Thr Tyr Asp Thr Tyr Val Glu Phe Gly Phe Ala
85 90 95

Ser Gly Arg Ala Thr Leu Lys Lys Gly Gln Phe Ile Thr Ile Gln Gly
100 105 110

Arg Ile Thr Lys Ser Asp Trp Ser Asn Tyr Thr Gln Thr Asn Asp Tyr
115 120 125

Ser Phe Asp Ala Ser Ser Ser Thr Pro Val Val Asn Pro Lys Val Thr
130 135 140

Gly Tyr Ile Gly Gly Ala Lys Val Leu Gly Thr Ala Pro Gly Pro Asp
145 150 155 160

Val Pro Ser Ser Ile Ile Asn Pro Thr Ser Ala Thr Phe Asp Pro Gly
165 170 175

Thr Met Ala Ala Thr Ser Ser Met Ser Val Glu Phe Tyr Asn Ser Asn
180 185 190

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Lys Ser Ala Gln Thr Asn Ser Ile Thr Pro Ile Ile Lys Ile Thr Asn
        195                 200                 205
Thr Ser Asp Ser Asp Leu Asn Leu Asn Asp Val Lys Val Arg Tyr Tyr
    210                 215                 220
Tyr Thr Ser Asp Gly Thr Gln Gly Gln Thr Phe Trp Cys Asp His Ala
225                 230                 235                 240
Gly Ala Leu Leu Gly Asn Ser Tyr Val Asp Asn Thr Ser Lys Val Thr
                245                 250                 255
Ala Asn Phe Val Lys Glu Thr Ala Ser Pro Thr Ser Thr Tyr Asp Thr
            260                 265                 270
Tyr Val Glu Phe Gly Phe Ala Ser Gly Arg Ala Thr Leu Lys Lys Gly
        275                 280                 285
Gln Phe Ile Thr Ile Gln Gly Arg Ile Thr Lys Ser Asp Trp Ser Asn
    290                 295                 300
Tyr Thr Gln Thr Asn Asp Tyr Ser Phe Asp Ala Ser Ser Ser Thr Pro
305                 310                 315                 320
Val Val Asn Pro Lys Val Thr Gly Tyr Ile Gly Gly Ala Lys Val Leu
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Gly Thr Ala Pro
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<222> (3)..(791)
<223> pRIT2T cloning vector
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<221> misc_feature
<222> (795)..(1280)
<223> from cbpA gene

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actctcaagc tccaaaagct gatgcgcaac aaaataactt caacaaagat caacaaagcg    180
ccttctatga aatcttgaac atgcctaact taaacgaagc gcaacgtaac ggcttcattc    240
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aaagtcttaa agacgaccca agccaaagca ctaacgtttt aggtgaagct aaaaaattaa 300

acgaatctca agcaccgaaa gctgataaca atttcaacaa agaacaacaa aatgctttct 360

atgaaatctt gaatatgcct aacttaaacg aagaacaacg caatggtttc atccaaagct 420

taaaagatga cccaagccaa agtgctaacc tattgtcaga agctaaaaag ttaaatgaat 480

ctcaagcacc gaaagcggat aacaaattca acaaagaaca acaaaatgct ttctatgaaa 540

tcttacattt acctaactta aacgaagaac aacgcaatgg tttcatccaa agcctaaaag 600

atgacccaag ccaaagcgct aacctttag cagaagctaa aaagctaaat gatgctcaag 660

caccaaaagc tgacaacaaa ttcaacaaag aacaacaaaa tgctttctat gaaattttac 720

atttacctaa cttaactgaa gaacaacgta acggcttcat ccaaagcctt aaagacgatc 780

cggggaattc catggcagcg acatcatcaa tgtcagttga attttacaac tctaacaaat 840

cagcacaaac aaactcaatt acaccaataa tcaaaattac taacacatct gacagtgatt 900

taaatttaaa tgacgtaaaa gttagatatt attacacaag tgatggtaca caaggacaaa 960

ctttctggtg tgaccatgct ggtgcattat taggaaatag ctatgttgat aacactagca 1020

aagtgacagc aaacttcgtt aaagaaacag caagcccaac atcaacctat gatacatatg 1080

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aaggaagaat aacaaaatca gactggtcaa actacactca aacaaatgac tattcatttg 1200

atgcaagtag ttcaacacca gttgtaaatc caaaagttac aggatatata ggtggagcta 1260

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<210> 8

<211> 426

<212> PRT

<213> recombinant protein sequence

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<222> (1)..(263)

<223> protein A from cloning vector

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<221> misc_feature

<222> (265)..(426)

<223> CBPA

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20 25 30

Gly Glu Ala Gln Lys Leu Asn Asp Ser Gln Ala Pro Lys Ala Asp Ala
35 40 45

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Gln Gln Asn Asn Phe Asn Lys Asp Gln Gln Ser Ala Phe Tyr Glu Ile
    50                  55                  60
Leu Asn Met Pro Asn Leu Asn Glu Ala Gln Arg Asn Gly Phe Ile Gln
65                  70                  75                  80
Ser Leu Lys Asp Asp Pro Ser Gln Ser Thr Asn Val Leu Gly Glu Ala
                85                  90                  95
Lys Lys Leu Asn Glu Ser Gln Ala Pro Lys Ala Asp Asn Asn Phe Asn
            100                 105                 110
Lys Glu Gln Gln Asn Ala Phe Tyr Glu Ile Leu Asn Met Pro Asn Leu
        115                 120                 125
Asn Glu Glu Gln Arg Asn Gly Phe Ile Gln Ser Leu Lys Asp Asp Pro
    130                 135                 140
Ser Gln Ser Ala Asn Leu Leu Ser Glu Ala Lys Lys Leu Asn Glu Ser
145                 150                 155                 160
Gln Ala Pro Lys Ala Asp Asn Lys Phe Asn Lys Glu Gln Gln Asn Ala
                165                 170                 175
Phe Tyr Glu Ile Leu His Leu Pro Asn Leu Asn Glu Glu Gln Arg Asn
            180                 185                 190
Gly Phe Ile Gln Ser Leu Lys Asp Asp Pro Ser Gln Ser Ala Asn Leu
        195                 200                 205
Leu Ala Glu Ala Lys Lys Leu Asn Asp Ala Gln Ala Pro Lys Ala Asp
    210                 215                 220
Asn Lys Phe Asn Lys Glu Gln Gln Asn Ala Phe Tyr Glu Ile Leu His
225                 230                 235                 240
Leu Pro Asn Leu Thr Glu Glu Gln Arg Asn Gly Phe Ile Gln Ser Leu
                245                 250                 255
Lys Asp Asp Pro Gly Asn Ser Met Ala Ala Thr Ser Ser Met Ser Val
            260                 265                 270
Glu Phe Tyr Asn Ser Asn Lys Ser Ala Gln Thr Asn Ser Ile Thr Pro
        275                 280                 285
Ile Ile Lys Ile Thr Asn Thr Ser Asp Ser Asp Leu Asn Leu Asn Asp
    290                 295                 300
Val Lys Val Arg Tyr Tyr Tyr Thr Ser Asp Gly Thr Gln Gly Gln Thr
305                 310                 315                 320
Phe Trp Cys Asp His Ala Gly Ala Leu Leu Gly Asn Ser Tyr Val Asp
                325                 330                 335
Asn Thr Ser Lys Val Thr Ala Asn Phe Val Lys Glu Thr Ala Ser Pro
            340                 345                 350
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Thr Ser Thr Tyr Asp Thr Tyr Val Glu Phe Gly Phe Ala Ser Gly Arg
355 360 365

Ala Thr Leu Lys Lys Gly Gln Phe Ile Thr Ile Gln Gly Arg Ile Thr
370 375 380

Lys Ser Asp Trp Ser Asn Tyr Thr Gln Thr Asn Asp Tyr Ser Phe Asp
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Gly Gly Ala Lys Val Leu Gly Thr Ala Pro
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<211> 984
<212> DNA
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<221> misc_feature
<222> (652)..(981)
<223> taken from bovine
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tctgacagtg atttaaattt aaatgacgta aaagttagat attattacac aagtgatggt 240
acacaaggac aaactttctg gtgtgaccat gctggtgcat tattaggaaa tagctatgtt 300
gataacacta gcaaagtgac agcaaacttc gttaaagaaa cagcaagccc aacatcaacc 360
tatgatacat atgttgaatt tggatttgca agcggacgag ctactcttaa aaaaggacaa 420
tttataacta ttcaaggaag aataacaaaa tcagactggt caaactacac tcaaacaaat 480
gactattcat ttgatgcaag tagttcaaca ccagttgtaa atccaaaagt tacaggatat 540
ataggtggag ctaaagtact tggtacagca ccaggtccag atgtaccatc ttcaataatt 600
aatcctactt ctgcaacatt tgatcccggt accatgggtc ctcctcctgg aagcacttcc 660
gctgccagca gctccaacta ttgcaaccag atgatgaaga gccggaacct gaccaaagat 720
cgatgcaagc cagtgaacac ctttgtgcac gagtccctgg ctgatgtcca ggccgtgtgc 780
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<212> DNA

<213> Synthetic Oligonucleotide;

<400> 13

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